



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2015-0758; Special Conditions No. 25-586-SC]

Special Conditions: L-3 Communications Integrated Systems, Boeing Model 747-8 Series Airplanes; Therapeutic Oxygen for Medical Use

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Boeing Model 747-8 series airplanes.

These airplanes, as modified by L-3 Communications Integrated Systems (L-3 Communications), will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. This design feature is therapeutic oxygen for medical use installed in an executive-interior airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Effective **[Insert date of publication in the *Federal Register*]**.

FOR FURTHER INFORMATION CONTACT: Robert Hettman, FAA, Propulsion and Mechanical Systems, ANM-112, Transport Airplane Directorate, Aircraft Certification Service,

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SUPPLEMENTARY INFORMATION:

Background

On May 10, 2011, L-3 Communications applied for a supplemental type certificate (STC) for therapeutic oxygen for medical use in the Boeing Model 747-8 series airplanes equipped with executive interiors. The Boeing Model 747-8 series airplane, which is a derivative of the Boeing Model 747-400 airplane currently approved under Type Certificate No. A20WE, is a four-engine jet transport airplane that will have a maximum takeoff weight of 970,000 lbs. The Model 747-8 airplane will have 153 seats approved for taxi, takeoff, and landing (19 crewmembers and 134 passengers).

Section 25.1445 includes standards for oxygen distribution systems when oxygen is supplied to flightcrew and passengers. If a common source of supply is used, § 25.1445(a)(2) requires a means to separately reserve the minimum supply required by the flightcrew. This requirement was included in § 25.1445 when the regulations were codified, and was originally added to Civil Air Regulations 4b.831 at Amendment 4b-13, effective September 21, 1949.

It is apparent that the regulation is intended to protect the flightcrew by ensuring that an adequate supply of oxygen is available to complete a descent and landing following a loss of cabin pressure. When the regulation was written, the only passenger oxygen system designs were supplemental oxygen systems intended to protect passengers from hypoxia in the event of a decompression. Existing passenger oxygen systems did not include design features that would allow the flightcrew to control oxygen to passengers during flight. There are no similar requirements when oxygen is supplied from the same source to passengers for use during a

decompression and for discretionary/first-aid use any time during the flight. In the proposed design, the passenger and therapeutic oxygen systems use the same source of oxygen. The flightcrew oxygen emergency system uses a dedicated source of oxygen independent from the passenger oxygen system. An oxygen duration chart and operation procedures will be incorporated into the “Flight Crew Operating Manual” and “Flight Manual Supplement,” as part of the STC, to provide information to the flightcrew to determine when to cease operation of the therapeutic system as a means by which to reserve the minimum supply of supplemental passenger oxygen.

Type Certification Basis

Under the provisions of § 21.101, L-3 Communications must show that the Boeing Model 747-8 series airplanes, as changed, continue to meet the applicable provisions of the regulations listed in Type Certificate No. A20WE, or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

If the Administrator finds that the applicable airworthiness regulations (i.e., Title 14, Code of Federal Regulations (14 CFR) part 25) do not contain adequate or appropriate safety standards for the Boeing Model 747-8 series airplanes because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the applicant apply for a supplemental type certificate to modify any other model included on the same type certificate to incorporate the same or similar novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Boeing Model 747-8 series airplanes must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34; and the noise certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Features

The L-3 Communications modifications to the Boeing Model 747-8 series airplanes will incorporate the following novel or unusual design feature:

L-3 Communications is seeking certification of an interior modification to Boeing Model 747-8 series airplanes to include executive and medical patient transport. As a part of the executive interior installation, the airplane will be outfitted with a therapeutic oxygen system. The therapeutic oxygen system shares the same supply of oxygen with the existing passenger oxygen system and consists of multiple constant flow oxygen outlets located throughout the cabin. The flightcrew can turn the therapeutic oxygen system on and off from the flight deck to allow use at any point during the flight, and to preserve a sufficient remaining oxygen reserve, in the event therapeutic oxygen is used for medical purposes, to accommodate the passengers in the event of an emergency oxygen situation.

The gaseous passenger oxygen system will be modified to accommodate additional supply cylinders and several therapeutic oxygen outlets located throughout the cabin. Each therapeutic outlet will provide a constant flow of oxygen at either 2 or 4 liters per minute. The flightcrew will be able to control the flow of therapeutic oxygen at any time during flight. Therapeutic oxygen systems previously have been certified, and were generally considered an extension of the passenger oxygen system for the purpose of defining the applicable regulations.

As a result, the applicable regulations included those that applied to oxygen systems in general, or supplemental oxygen systems.

Discussion

No specific regulations address the design and installation of oxygen systems used specifically for therapeutic applications. Existing requirements, such as §§ 25.1309, 25.1441(b) and (c), 25.1451, and 24.1453, in the Boeing Model 747-8 series airplanes certification basis applicable to this STC project, provide some design standards appropriate for oxygen system installations. However, additional design standards for systems supplementing the existing oxygen system are needed to complement the existing applicable requirements. The addition of equipment involved in this installation, and the unsafe conditions that can exist when the oxygen content of an enclosed area becomes too high because of system leaks, malfunction, or damage from external sources, make it necessary to ensure that adequate safety standards are applied to the design and installation of the oxygen system in Boeing Model 747-8 series airplanes. These potential hazards also necessitate development and application of appropriate additional design and installation standards.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Discussion of Comments

Notice of proposed special conditions No. 25-15-05-SC for the L-3 Communications modifications to the Boeing Model 747-8 series airplanes was published in the **Federal Register** on April 30, 2015 (80 FR 24225). No comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions are applicable to Boeing Model 747-8 series airplanes. Should L-3 Communications apply at a later date for a supplemental type certificate to modify any other model included on Type Certificate No. A20WE to incorporate the same novel or unusual design feature, these special conditions would apply to that model as well.

Under standard practice, the effective date of final special conditions would be 30 days after the date of publication in the ***Federal Register***; however, as the certification date for the L-3 Communications modifications to Boeing Model 747-8 series airplanes is imminent, the FAA finds that good cause exists to make these special conditions effective upon publication.

Conclusion

This action affects only certain novel or unusual design features on one model series of airplanes. It is not a rule of general applicability, and affects only the applicant who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Boeing Model 747-8 series airplanes as modified by L-3 Communications Integrated Systems.

The distribution system for the therapeutic-oxygen system must be designed and installed as follows:

When oxygen is supplied to passengers for both supplemental and therapeutic purposes, the distribution system must be designed for either—

1. A source of supplemental supply for protection from hypoxia following a loss of cabin pressure, and a separate source for therapeutic purposes, or
2. A common source of supply, with means to separately reserve the minimum supply required by the passengers for supplemental use following a loss of cabin pressure.

Issued in Renton, Washington, on June 17, 2015.

Jeffrey E. Duven

Manager, Transport Airplane Directorate

Aircraft Certification Service

[FR Doc. 2015-15546 Filed: 6/24/2015 08:45 am; Publication Date: 6/25/2015]